



NOAA
FISHERIES

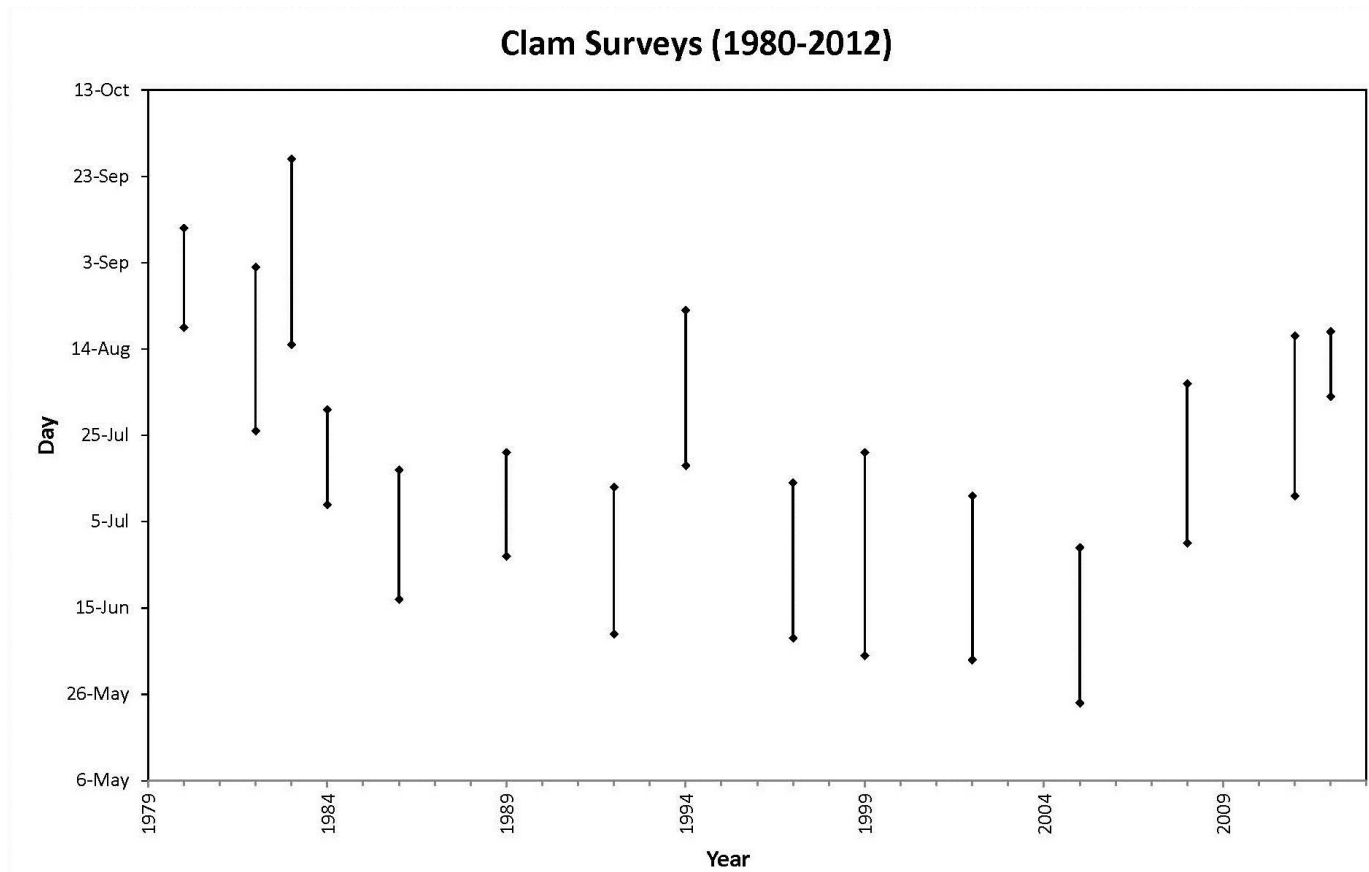
**Northeast
Fishery
Science Center**

Ecosystems Surveys Branch Data Collection Programs Surfclam/Ocean Quahog Survey

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Surfclam/Ocean Quahog Survey: Longevity



Surfclam/Ocean Quahog Survey: Vessel Changes

NOAA Ship *Delaware II*
1978 - 2010
155' LOA
30' Breadth
17' depth
18 Officers and Crew
14 Scientific Staff



FV *ESS Pursuit*
2012 – present
165' LOA
43' Breadth
14' depth
6 Crew
9 Scientific Staff



Surfclam/Ocean Quahog Survey: Dredge and Protocols

NOAA Scientific Dredge

Design Features

- 5' width
- 3' high
- 2" (lobster trap material) liner
- Underwater electric pump (1500gpm)

Basic Protocols

- 5 minute tow duration (winch lock to haulback)
- 3.0 knots
- Average tow distance of 0.35 nm
- Generally towed in direction of next station
- Tow success determined after completion

Commercial Dredge

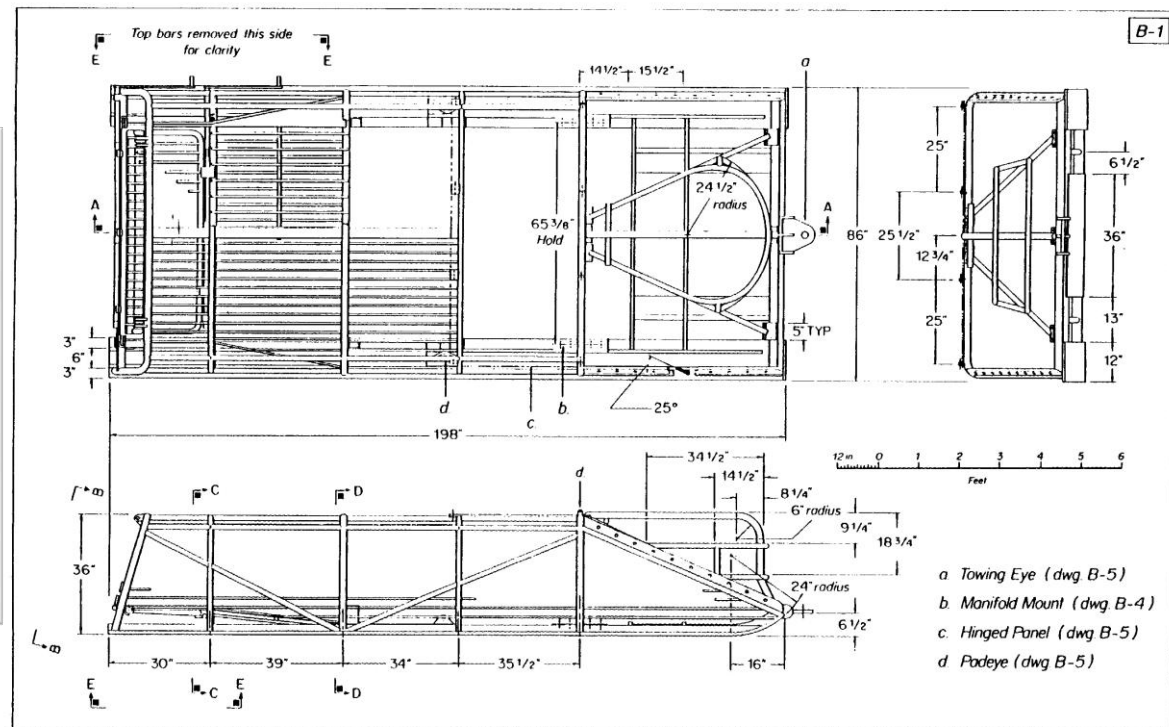
Design Feature:

- 13' width
- 3.5 high
- Bar spacing (2")
- Surface pump (1500gpm)

Basic Protocols

- 5 minute tow duration (winch lock to haulback)
- 3.0 knots
- Average tow distance of 0.35 nm
- Generally towed in direction of next station
- Tow success determined after completion

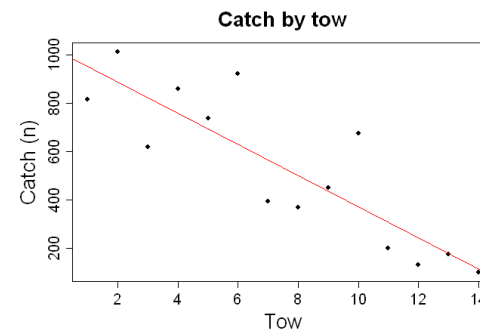
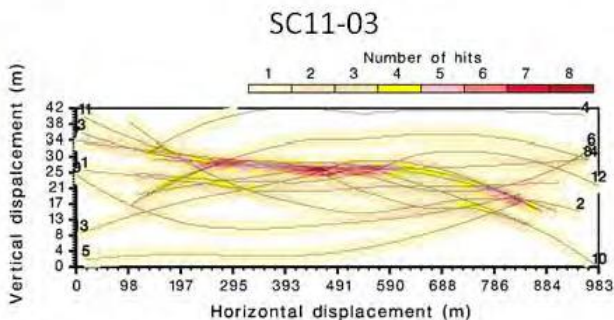
Surfclam/Ocean Quahog Survey: Dredges



Surfclam/Ocean Quahog Survey: Calibration

Dredge efficiency is estimated directly, through depletion experiments

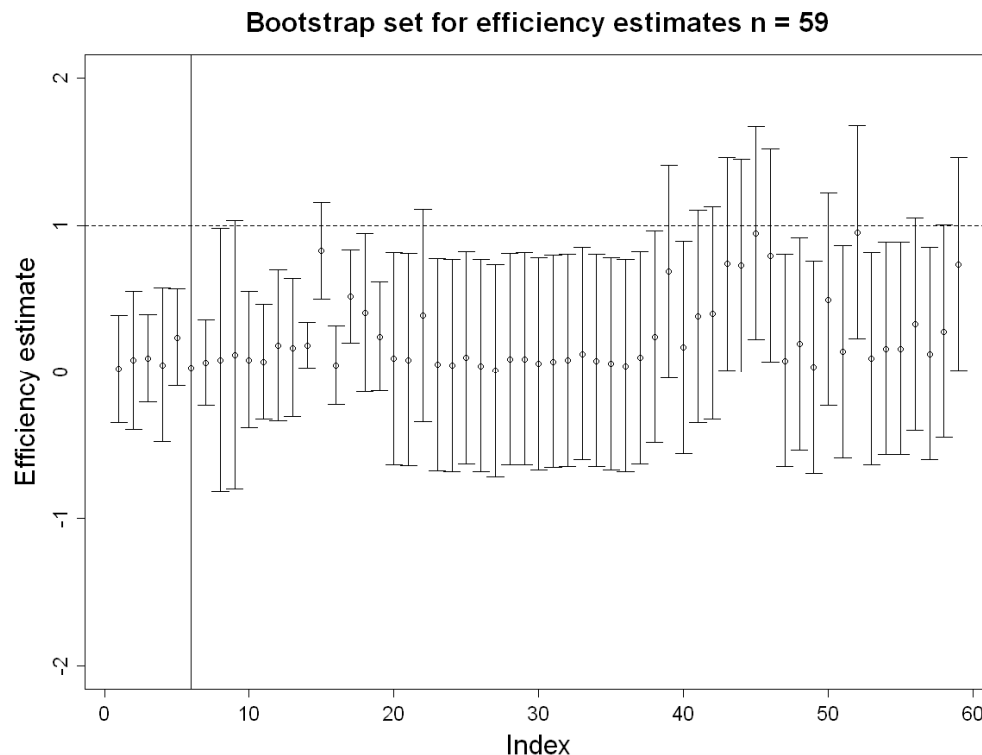
- At an experimental site, 5 tows are initially made, spaced over the experimental area.
- These “set-up” tows provide one estimate of density, d .
- Tows are repeated in the area, perpendicular to the “set-up” tows.



- Density from these repeat tows, D , is estimated using Patch model, which accounts for amount of area towed over repeatedly (once, twice, ...) but is essentially a catch curve.
- Dredge efficiency $e = d/D$
- Efficiency is closely related to catchability q through scale parameters.

Surfclam/Ocean Quahog Survey: Calibration

Estimates of dredge efficiency are highly variable



- Substrate
- Current
- Winds

Size-selectivity through paired tows, survey and commercial gear

Surfclam/Ocean Quahog Survey: Survey Design

July - August

Virginia to Georges Bank

450 dredge stations

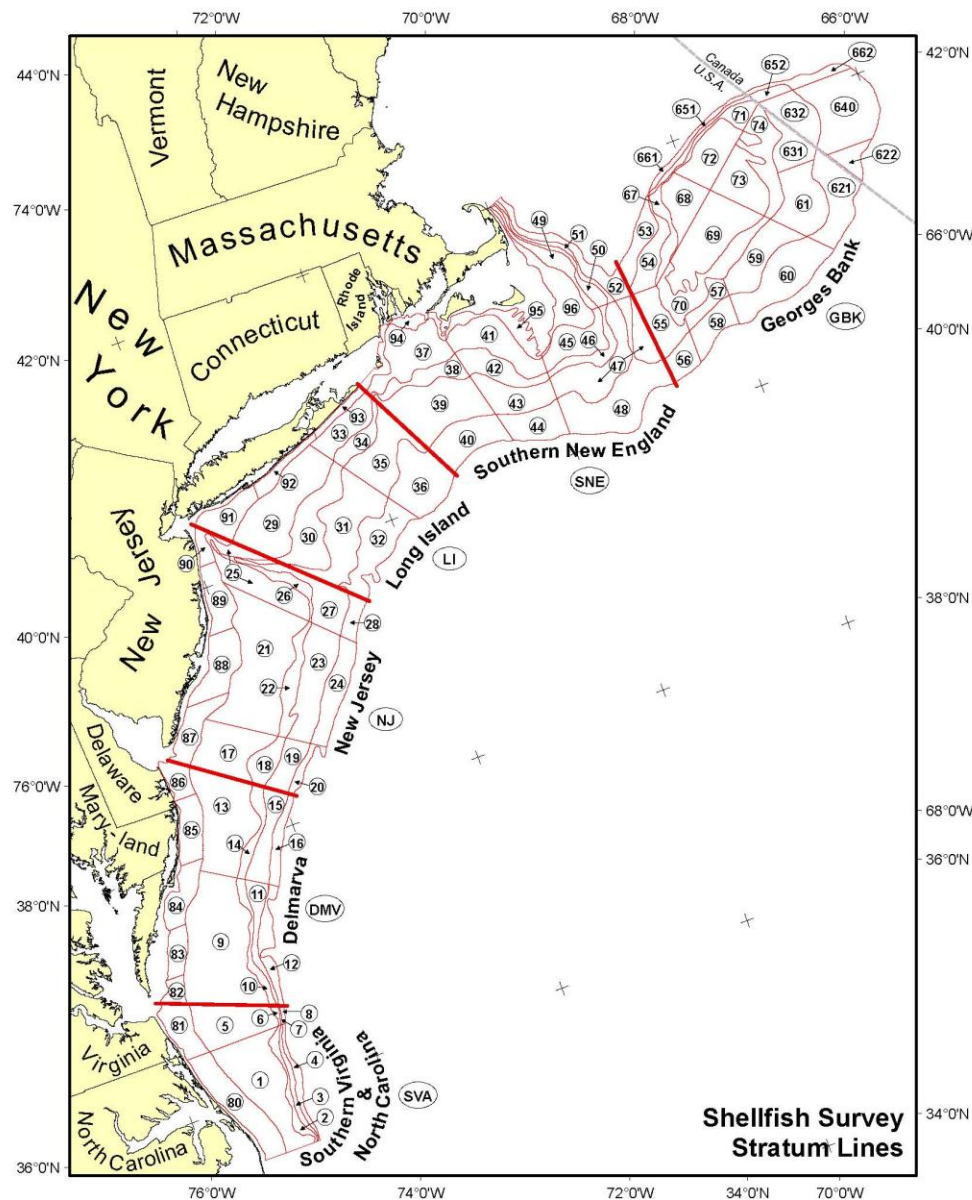
15 (36) sea days

Stratified Random Design:

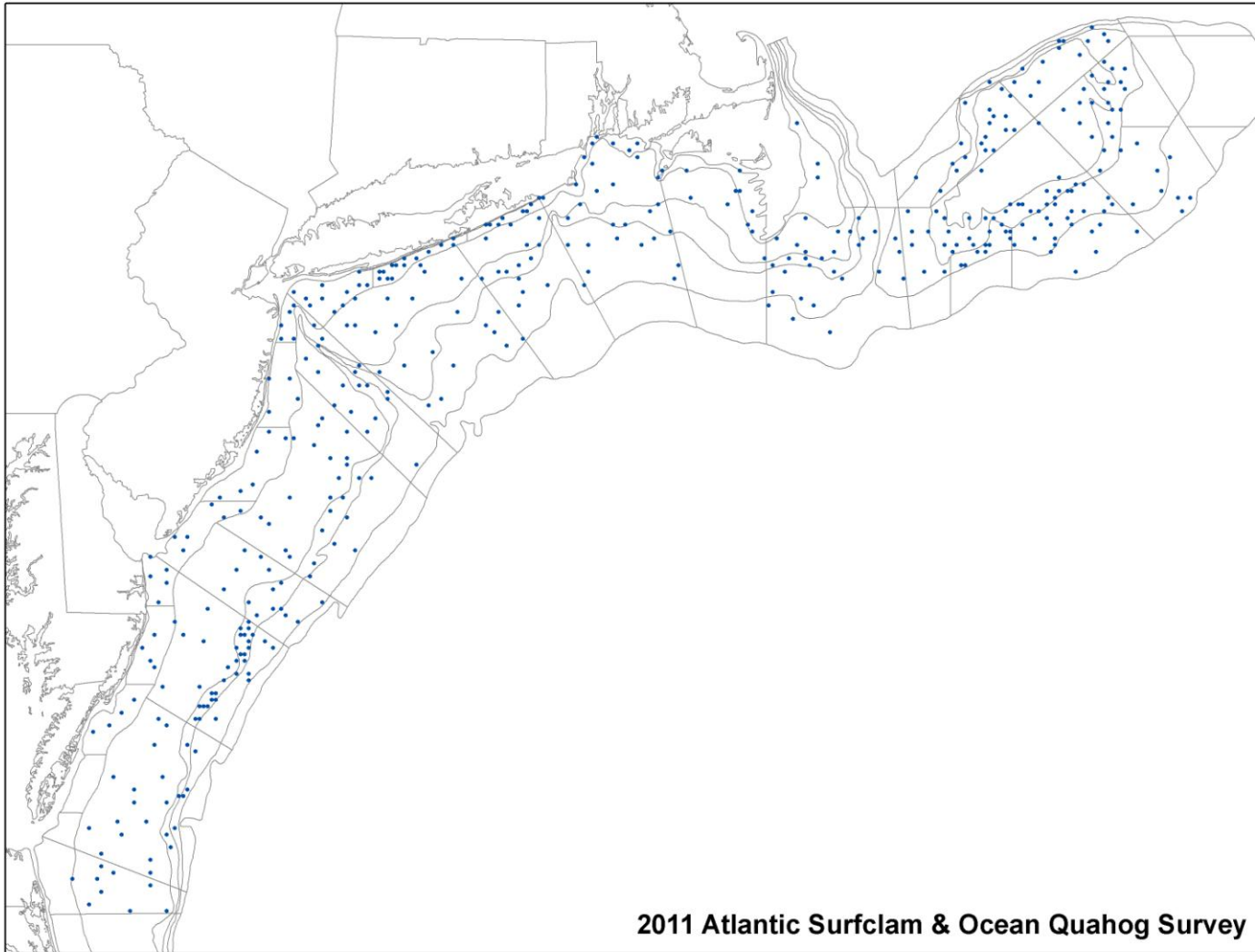
- Strata are delineated by depth and region
- Station locations are randomly selected within strata.

Strata depth ranges:

- 9 - 27 meters (5 - 15 Fm)
- 27 - 45 meters (15 - 25 Fm)
- 45 - 55 meters (25 - 30 Fm)
- 55 - 73 meters (30 - 40 Fm)
- 73 - 110 meters (40 - 60 Fm)



Surfclam/Ocean Quahog Survey: Survey Design



Surfclam/Ocean Quahog Survey: Catch Sampling Processes

Catch passes over a shaker table to remove habitat

Each species or component is weighed

Every effort is made to measure every clam captured. When that is not practical we have several sub-sampling options:

- “By Volume” Sub-Sample Method
- “By Length” Sub-Sample Method

Meat weight sampling

- Meat weights are used to calculate a yearly meat weight/ shell height relationship for assessment models.
- Gonad weight is used in fecundity studies and assessment models.

Other species (fish, inverts) are counted and measured



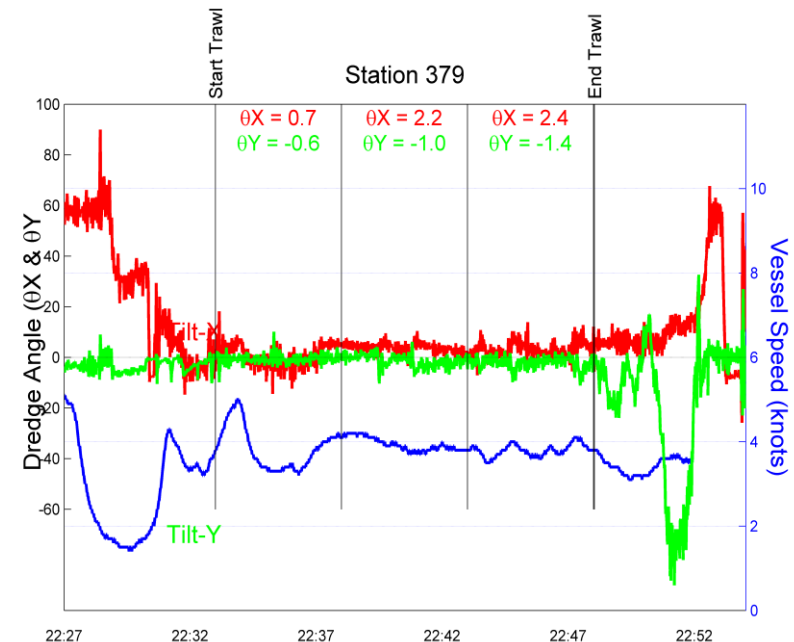
Surfclam/Ocean Quahog Survey: Tow Standardization Efforts

A tow time of 5 minutes is based on winch lock to haulback.

Each dredge is equipped with sensors that collect:

- temperature
- depth
- tilt
- flip
- manifold pressure (1500 GPM) and
- ambient pressure information

These data are used to eliminate non-representative tows from analysis.



Surfclam/Ocean Quahog Survey: Gear Standardization Efforts

NOAA Dredge

- Clam dredges are very durable (and expensive). We have 2 and have been using these for many years.
- Each dredge is inspected before and after each survey.
- Dredges are inspected for damage and wear on a tow by tow basis. Any issues are resolved before the dredge is put back into service.

Industry Dredge

- The industry owned dredge has been used during testing and since survey migration to commercial vessels.
- This dredge is only used for the NOAA survey.
- The gear is inspected yearly prior to the survey.
- The gear is inspected at the completion of each deployment.

Surfclam/Ocean Quahog Survey: Products

Biomass, abundance and distribution

- Surfclam and ocean quahog stock assessments
- Ecosystems management

Demographics – size, age, sex

- Surfclam and ocean quahog stock assessments

Surfclam/Ocean Quahog Survey: Strengths

Time-series length

Survey design

Standardization – gear, tow, catch processing

Surfclam/Ocean Quahog Survey: Challenges

Expensive

Limited annual coverage

Lack of automated tow evaluation product (real-time sensors)

Survey drift

Surfclam/Ocean Quahog Survey: Proposed Solutions

Expensive – alternative vessels

Limited annual coverage – alternative pump power

Lack of automated tow evaluation product – survey sensor package

Survey drift – increased calibration efforts